CLASSROOM MISBEHAVIOR AS A CONTEXT FOR LEARNING DURING EARLY ELEMENTARY SCHOOL

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Teachers and school administrators often point to misbehavior as a significant impediment to teaching and learning. However, there is limited research considering whether classroom misbehavior influences achievement during elementary school. The present study examined how misbehavior in classrooms relates to children's math and reading skills from kindergarten through third grade. Furthermore, it considered whether differences in children's approaches to learning (ATL) and teachers' instructional practices are pathways through which misbehavior affects achievement. Using data from the ECLS-K (n=13,700), this study found that increases in levels of classroom misbehavior are related to reductions in reading and math achievement, even when controlling for individual children's externalizing behaviors. Children's ATL and teachers' instructional time and pedagogical approach partially explain these associations. Implications for theory, measurement, and future research are discussed.

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1.0 INTRODUCTION

There is ample evidence to suggest that externalizing behaviors threaten children's academic development (Hinshaw, 1992; Martin & Hoffman, 1990; Jimerson, Egeland & Teo, 1999; Raver C. C., 2002; Wentzel & Asher, 1995). Children with elevated externalizing behaviors are more likely to engage in forms of non-academic actions (e.g., aggression, impulsivity, hyperactivity, talking, arguing, and rule-breaking) that interfere with learning in the classroom (Abikoff et al., 2002; Junod et al., 2006). Learning alongside peers who have difficulty staying in their seats, talk out of turn, and get into fights may be challenging for even the most well-behaved students. Indeed, recent evidence suggests that externalizing behavior in classrooms may have an impact that extends beyond the misbehaving student's own achievement (McKee, Rivkin, & Sims, 2010). Although one in five teachers note that misbehavior interferes with student learning (NCES, 2000), few studies have considered the unique role that misbehaving classmates may play in achievement outcomes - independent of children's own externalizing behaviors. Instead, the literature has traditionally focused on individual-level behaviors and processes. As a result, the pathways through which classroom behavior shapes children's academic development are also not well understood. High levels of classroom misbehavior may inhibit important learning processes and instructional opportunities for all students, regardless of whether particular children display externalizing behaviors themselves.

The goal of this study is to strengthen knowledge related to how classroom misbehavior influences children's math and reading skills during elementary school, above and beyond individual externalizing behaviors. This investigation will also consider whether differences in approaches to learning (ATL) and teachers' instructional practices are pathways through which class misbehavior relates to individual children's achievement.

1.1 THEORETICAL FRAMEWORK

This study is based upon the dynamic model of educational effectiveness (Creemers & Kyriakidis, 2008; Creemers & Reezigt, 1996) and bioecological models of child development (Bronfenbrenner & Morris, 1998), which highlight the importance of understanding how proximal experiences and reciprocal interactions in classroom settings contribute to differences in academic achievement. According to these conceptual models, children's characteristics and behaviors affect the classrooms in which they learn, as well as their experiences within these contexts (Creemers & Reezigt, 1996). In turn, children's learning environments, as well as the behavioral characteristics of other children within them, produce proximal processes and interactions that drive learning (Bronfenbrenner & Morris, 1998). Specifically, the behavioral characteristics of classmates may affect an individual child's achievement-related behaviors, the amount, structure, and type of instruction the child receives, and the child's academic outcomes.

1.2 CLASSROOM MISBEHAVIOR AND ACAEMIC SKILL DEVELOPMENT

A small body of research suggests that classrooms characterized by misbehavior influence children's achievement, even after accounting for individual externalizing behaviors. For instance, the addition of one potentially misbehaving child to a classroom has been associated with small drops in children's math performance, with effect sizes ranging from .02 to .04 (Figlio, 2007). Having a classmate identified with an emotional problem is also associated with a decrease of approximately 10% of a standard deviation in math and reading achievement scores (Fletcher, 2009). Even the simple presence of one additional male student, who tend to be more disruptive in school settings, has been associated with a 20% of a standard deviation decrease in achievement (Hoxby, 2000). On the other hand, interventions aimed at improving classroom climate have increased harmony, respect, and cooperation between teachers and students, as well as improved test scores (Ross & Lowther, 2003).

1.3 CLASSROOM MISBEHAVIOR AND STUDENT-CENTERED PROCESSES

Although some studies posit that classroom and child processes may partially explain associations between measures of class behavior and achievment (Bradshaw *et al.,* 2010; Creemers & Kyrikidis, 2008; Rimm-Kauffmann, Fan, Chiu, & You, 2007), most fall short of elucidating the pathways. One way classrooms characterized by misbehavior may influence academic development is through children's Approaches to Learning (ATL). ATL reflect a child's task persistence and ability to manage behavior, emotions, and attention in voluntary and adaptive ways (Calkins & Fox, 2002; Eisenberg & Spinard, 2004). More adaptive ATL are

linked to better performance in reading and math (McClelland, Acock, & Morrison, 2006; McClelland, Morrison, & Holmes, 2000), more advanced vocabulary, literacy, and computation skills (Fantuzzo et al., 2007; McWayne, Fantuzzo, & McDermott, 2004), and faster growth of academic skills throughout elementary school (Li-Grining, Votruba-Drzal, Maldonado-Carreno, & Haas, 2010).

Classrooms with misbehaving students are likely to be characterized by distractions that inhibit adaptive ATL by challenging children's capacity to regulate their attention and to persist through difficult tasks. When elevated levels of misbehavior also compromise perceptions of safety and support, children can become less engaged in school, less eager to learn, and less able to focus attention on learning (Brand, Felner, Shim, Seitsinger, & Dumas, 2003; Furrer & Skinner, 2003). Indeed, trusting and positive classroom climates have been linked to improvements in dimensions of ATL such as participation, academic engagement, and task persistence (see Zins, Bloodworth, Weissberg, & Walberg, 2004, for review). Misbehavior may also compromise ATL by exposing children to higher levels of daily stress, which is associated with greater hypothalamic-pituitary-adrenocortical (HPA) axis activation and elevated cortisol levels (Lupien, McEwen, Gunnar, & Heim, 2009). In turn, these problems have been linked with behavioral inhibition and reticence (Rubin, Bowker, & Kennedy, 2009), and may reduce class participation or eagerness to learn. However, no studies to date have directly tested whether ATL are an important pathway through which classroom misbehavior affects learning.

1.4 CLASSROOM MISBEHAVIOR AND CLASSROOM PROCESSES

Classroom misbehavior may also relate to academic achievement through teachers' instructional practices. Instructional quantity, structure, and pedagogical approach are three instructional dimensions associated with student achievement (Barr & Dreeben, 1983; Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008), and may be influenced by misbehavior (Creemers & Kyriakidis, 2008; Lazear, 2001; McKee, Rivkin, & Sims, 2010).

The amount of instruction that students experience during the school day is an important predictor of learning, and may depend in part on the behavioral characteristics of children within a classroom (Berliner, 1990; Lazear, 2001; McKee, Rivkin, & Sims, 2010). There is significant variability in the amount of instructional time that students experience during elementary school (Brown & Saks, 1986; Hossler, Stage, & Gallagher, 1988). If high levels of classroom misbehavior require teachers to devote a greater amount of time to non-instructional tasks and thereby reduce the total minutes of instruction over the course of a school day, learning may be compromised (Lazear, 2001; McKee, Rivkin, & Sims, 2010).

Classroom misbehavior may also influence the structure of instruction that children experience. There is some evidence to suggest that teachers rely more heavily on undifferentiated large group instruction when instructing students with behavioral disorders (Vaughn, Levy, Coleman, & Bos, 2002). Although smaller groups are more effective in promoting learning and on-task activity (Agramonte & Belfiore, 2002; Elbaum, Vaughn, Hughes, & Moody, 2000; McMaster, Fuchs, & Fuchs, 2006; VanAuken, Chafouleas, Bradley, & Martens, 2002; Vaughn & Roberts, 2007), classroom misbehavior may reduce the feasibility of small-group instructional practices. When a teacher is engaged with a small group, the group experiences high levels of direction, instruction, and support for learning opportunities (Baker, Clark, Maier & Veiger,

2008). However, the remaining children within the classroom may experience considerably less structure and support. This may be challenging for children with elevated externalizing behaviors, who have difficulty regulating their attention, impulses, and emotions when receiving less direct supervision from teachers (Good, Grouws, Mason, Slavings, & Cramer 1990). Teachers in classrooms with greater levels of misbehavior may therefore rely more heavily on whole-group activities, which may compromise the learning of all children in the classroom.

Finally, classroom misbehavior may affect learning by influencing the type of instruction children receive. Direct instruction is rooted in a behavioral transmission model of learning, whereby emphasis is placed on systematic, rigorous, content-driven instruction (Floorman & Torgesen, 2001; Gamoran, 2001; Rosenshine & Stevens, 1986). In reading, the direct approach emphasizes paper-and-pencil grammatical and vocabulary exercises, teacher-directed instruction in phonemic awareness, and repeated spelling or punctuation exercises (Bodovski & Farkas, 2007; Xue & Meisels, 2004). In math, the direct, or "traditional," approach commonly emphasizes repetition and mastery of math facts, as well as worksheet or textbook-based skill development. Alternatively, constructivist instruction is based on Vygotskian principles that emphasize an interactive and collaborative acquisition of knowledge (Goodman, 1989; Xue & Meisels, 2004; Vygotsky, 1978). In reading, this might involve project-based activities, reading books aloud and to peers, or story-writing activities. In math, a constructivist, or "reform," approach might include creative problem solving, experiential learning opportunities, and hands-on manipulation. Teachers who utilize both approaches most effectively facilitate student learning (Castle, Riach, and Nicholson, 1994; Gamoran, 2001; Bodovski & Farkas, 2007; Xue & Meisels, 2004).

Teachers with students who more regularly misbehave may opt to forgo constructivist approaches that require more child-directed tasks with lower levels of teacher supervision, in favor of more easily managed direct instructional techniques that have high levels of structure (Baker et al, 2008; Lee, 2006; Munk & Repp, 1994). In general, externalizing behaviors are least likely to occur during teacher-driven direct instruction, and most likely to occur during child-driven independent and cooperative learning experiences (Nelson & Roberts, 2000). Teachers may implicitly understand this, as children identified with serious emotional disturbances (SEDs) spend considerably more time on worksheets and bookwork than in child-driven activities (Vaughn et. al., 2002). Thus, it is possible that children in classrooms with higher levels of misbehavior are exposed to more direct instructional styles that ease classroom management requirements. This may offset the balance of constructivist and direct approaches, and serve as a pathway linking classroom misbehavior and individual achievement.

1.5 LIMITATIONS IN PREVIOUS RESEARCH

Although research suggests that misbehavior in classrooms may influence academic achievement, there are several shortcomings in this literature. First, the majority of studies have only examined class misbehavior in middle- and high-school contexts (Barton et. al., 1998; de Jong et. al., 2004; Figlio, 2007; Hoxby, 2001; Ross & Lowther, 2003). Because the nature, prevalence, and severity of externalizing behaviors change as children age, it is unclear whether the existing research focusing on older children can be generalized to those in early elementary school. For instance, while theft, gang activity, and drug use can characterize middle and high school externalizing behaviors, younger children are more likely to engage in behaviors

characterized by difficulty sitting still, talking out of turn, and fighting with peers (Campbell, 2008; Lavigne et. al., 1996). These are more prevalent and normative forms of misbehavior in early learning contexts, and may exert an effect on early achievement and basic skill development.

Second, although there has been some theoretical writing about the importance of classroom behavior (Creemers & Kyriakidis, 2008; Lazear, 2001; McKee, Rivkin, & Simms, 2010), previous investigations of this relationship utilize small samples recruited from a select number of schools and districts (Hoxby, 2001; Figlio, 2007), or rely on indirect measures of classroom behavior (e.g., Figlio, 2007; Hoxby, 2001; Lazear, 2001; McKee, Rivkin, & Simms, 2010). This limits the extent to which findings can be generalized to a nationally representative sample of children, and makes it difficult to elucidate the pathways and processes by which misbehavior may relate to student achievement.

Third, the intervention literature suggests that improvements in classroom misbehavior is associated with gains in children's achievement, with effect sizes ranging from .24 to .54 (Bradshaw *et al.,* 2010; Eber, Lewandowski, Hyde, & Phillips, 2008; Horner *et al.*, 2005; Lassen, Steele, & Sailor, 2006). Yet, these interventions simultaneously improve both behavior in the classroom and children's *own* externalizing behaviors. As a result, it remains unclear whether reduction in misbehavior is uniquely associated with improvements in achievement outcomes, or whether improvements in individual externalizing behaviors drive academic gains. Elucidating this relationship can help practitioners to target interventions towards the classrooms and children for whom intervention is most likely to be beneficial.

To address these limitations, the present study uses a large, longitudinal, and nationally representative dataset, the Early Childhood Longitudinal Study, Kindergarten Cohort (ECLS-K),

to examine associations between classroom misbehavior and academic achievement from kindergarten through third grade (U.S. Department of Education, 2001). This study makes use of teacher reports of classroom behavior to identify the relationship between misbehavior in learning contexts and academic development. This investigation also considers child- and classroom-level processes by which misbehavior relates to student learning. These methods improve upon previous investigations to more accurately explain variation in early achievement that set the stage for later student learning (U.S. Department of Education, 2001).

1.6 RESEARCH QUESTIONS

The overarching goal of this study is to strengthen our understanding of how misbehavior in early classroom contexts affects child achievement, independent of individual externalizing behaviors. Based on prior research and theory, this study tests two research questions.

1.6.1 1. Do children in classrooms characterized by high levels of misbehavior show lower levels of math and reading achievement than children in classrooms with less misbehavior, even after controlling for individual externalizing behaviors?

Children in classrooms and schools characterized by high levels of misbehavior will show lower levels of math and reading achievement than children in classrooms with less disruptive behaviors, even after controlling for individual externalizing symptoms.

1.6.2 2. Are children's approaches to learning and teachers' instructional practices important pathways through which classroom behavior affects learning?

It is hypothesized that children in classrooms characterized by high levels of misbehavior will have less adaptive approaches to learning than those characterized by less misbehavior. Furthermore, it is expected that classrooms with higher amounts of misbehavior will be linked to less instructional time, less small-group instruction, and a heavier reliance on direct instructional approaches. In turn, it is hypothesized that these processes will mediate any association between class misbehavior and student achievement.

2.0 METHOD

2.0.1 PARTICIPANTS

The proposed study uses data from the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K), a longitudinal study of 20,000 children entering kindergarten in the fall of 1998 (U.S. Department of Education, National Center for Education Statistics, 2001). The ECLS-K was designed to document the development of children from kindergarten through eighth grade. A multistage probability sampling design was utilized to select a nationally representative sample of children across the United States in its base year. The ECLS-K selected 1280 schools offering kindergarten programs across the United States using primary sampling units (PSU) of counties or groups of counties. A target sample of approximately 24 children from each public school and 12 children from each private school was drawn. At the time of recruitment, 51.7% of children were identified as non-Hispanic Caucasian, 14.7% were African American, 7% were Hispanic, 6% were Asian, and 11% as "other" (U.S. Department of Education, National Center for Education Statistics, 2001).

This investigation draws data from kindergarten through third grade and focuses on a subsample of approximately 13,700 children from the ECLS-K for whom longitudinal item response theory (IRT) scores from Kindergarten through third grade and a valid sampling weight (c245cw0) were available. Of these children, 34% had complete data on all variables from

kindergarten through third grade. Although only 3% of children were missing data on their achievement outcome scores, 53% of children had data missing from school or teacher questionnaires. More specifically, nearly 34% of children were missing principals' reports of the percent of children in each school with free or reduced lunch status. Beyond this, only 4.5% and 5.3% were missing data on items from the fall of Kindergarten cognitive assessments and the primary-caregiver's questionnaires, respectively. Regression analyses were conducted to compare children who had missing data on at least one variable (n ~=9,100) to those without any missing data (n ~=4,600). There were few meaningful differences, although children with no missing data were generally more advantaged. Specifically, these children were more likely to be non-Hispanic White, to have parents who earned more, primarily spoke English in their homes, were married, and had achieved a high school diploma or above.

Traditional approaches to handling missing data, such as listwise deletion or mean imputation, have been criticized for biasing estimates, misrepresenting statistical power, and leading to invalid conclusions (Acock, 2005; Rubin, 1987; Widaman, 2006). After examining patterns of missing data, Stata 10.0 was used to impute missing data using multiple imputation by chained equations (MICE; Royston, 2005). Based on the relative efficiency calculation by Rubin (1987), ten imputations were deemed sufficient for the level of missing data in this study. Results were combined and analyzed using standard techniques in the Stata software (StataCorp, 2005).

2.1 ANALYTIC APPROACH

The primary goal of this analysis is to examine the extent to which misbehavior in classrooms explain variability in children's reading and math skills, above and beyond individual externalizing behaviors. Hierarchical regressions were estimated in Stata 10 on a data set containing repeated measures of children's academic achievement from kindergarten, first, and third grades (StataCorp, 2007).

2.1.1 Equation 1

$$\text{Child Achievement}_{it.} = \alpha_{it} - \alpha_{i.} + ß_1\,\text{Misbehavior}_{it} + ß_2\,\text{time}_{it} + ß_3\,\text{time}_{it}^2 + ß_4\,\text{Child}_{it} + ß_5\,\text{Parent}_{it} + ß_6\,\text{Class}_{it} + ß_7\,\text{School}_{it} + ß_8\,\text{Extern}_{it} + \varepsilon_{it}$$

As shown in equation 1, children's academic achievement in the spring of kindergarten, first, and third grades were modeled as a function classroom-level misbehavior (*Misbehavior*), linear and quadratic number of months each child had been in school (*time*), child characteristics (*Child)*, parental and home characteristics (*Parent*), classroom characteristics (*Class*), school characteristics (*School*), and child externalizing behaviors (*Extern*). An individual-specific random effect was incorporated to take into account the nesting of data within child. To allow for generalizability to a nationally representative population of kindergarteners, the appropriate ECLS-K sampling weight (c245cw0) was applied to the data.

A secondary goal of this study is to determine whether approaches to learning and instructional practices mediate any link between classroom misbehavior and children's individual achievement. Thus, measures of approaches to learning (*ATL*) and teachers' math and

reading instructional characteristics (*instruction*) were added to equation 1. Sobel tests (Sobel, 1982) were then used as formal tests of mediation.

Using this approach to examine associations between learning environments and children's achievement outcomes raises concerns that children learning in different classrooms differ in unobservable ways. In other words, it is challenging to determine whether classroom misbehavior is actually linked to learning, or whether unmeasured key characteristics (e.g., school quality, degree of segregation within and between schools, neighborhood quality and safety, aggregate peer cognitive ability or motivation) differentiate classrooms with high- or low-amounts of misbehavior. If the most poorly behaved children are more likely to be from sociodemographically disadvantaged families and communities and less effective schools, an upward bias of the effect of class misbehavior on academic achievement would emerge that makes misbehavior appear to be disproportionately problematic for children. The random effects models that are described above are susceptible to these sorts of problems. Two strategies were therefore adopted to limit the influence of potentially omitted variables. First, all regression models included a comprehensive set of controls for characteristics of children, families, classrooms and schools. Second, child fixed-effects models were estimated to reduce the bias that comes from unobserved time invariant characteristics of students. While random effects models allow for more liberal estimates by relying on both within and between-child variability in classroom misbehavior, fixed effects models provide relatively conservative estimates by relying on within-child variability. It should be noted, however, that while fixed effects models control for all time-invariant characteristics, they are still susceptible to bias from time-varying omitted variables.

2.2 MEASURES

Measures used in the current study are described below. Unless otherwise specified, each measure was completed in fall and spring of K, and spring of first and third grade (U.S Department of Education, National Center for Education Statistics, 2001).

2.2.1 Child achievement

Children's reading and math skills are measured with item response theory (IRT) scale scores, derived from individualized direct cognitive batteries in both reading and mathematics (U.S. Department of Education, National Center for Education Statistics, 2001). The assessments included items created for the ECLS-K by a panel of experts, as well as items adapted from well-validated and reliable measures of children's cognitive and academic development, including the Woodcock-Johnson Tests of Achievement-Revised (WJ-R; Woodcock & Johnson, 1989, 1990), the Peabody Picture Vocabulary Test- Revised (PPVT-R; Dunn, 1981), and the Peabody Individual Achievement Test-Revised (PIAT-R; Dunn & Markwardt, 1970; Markwardt, 1989). The reading assessment included 72 items (α_1=.95, α_2=.96, α_3=.94) designed to measure children's language and literacy skills, including basic skills, vocabulary, and reading proficiency and comprehension. The math assessment included 64 items (α_1=.94 α_2=.94, α_3=.95) to evaluate children's skills in problem solving, number concepts, procedural knowledge, and measurement skills (U.S. Department of Education, National Center for Education Statistics, 2002).

2.2.2 Classroom misbehavior

The presence of classroom misbehavior was assessed in two ways. First, the ECLS-K collected information regarding teachers' perception of the behavior of children in their classes (U.S. Department of Education, National Center for Education Statistics, 2001). This question asks teachers "how [they] would rate the behavior of children within [their] class" on a scale that ranged from 1 ("*group misbehaves very frequently and is almost always difficult to handle"*) to 5 *("group behaves exceptionally well").* This item was then reverse-coded for analysis. Research suggests that teachers are accurate and reliable reporters of children's externalizing behaviors (Phares, 1997; Rescorla et. al., 2007). Second, teachers reported the number of children "disabled" by "serious emotional disturbances" (SEDs) in their classrooms during the spring of K, first, and third grades. Although these students can carry a range of impairing diagnoses, prior research suggests that children with DSM externalizing disorders (e.g., ODD, CD, ADHD) constitute more than two-thirds of students identified with SEDs (Silver et. al., 1992). This item specifically excluded children disabled by autism, learning disabilities, developmental delays, mental retardation, or physical and communication impairments. A dummy variable was created to indicate whether one or more child in the classroom was identified with an SED.

2.2.3 Individual behavior

Children's externalizing behaviors were assessed using a subscale of the Social Rating Scale (SRS). Teachers completed the SRS in fall and spring of K, and spring of first and third grade (U.S. Department of Education, National Center for Education Statistics, 2001). The SRS was adapted from the *Social Skills Rating Scale A ("How Often?")* for the purposes of the

ECLS-K (Gresham & Elliott, 1990). The externalizing scale includes items that are intended to measure potentially problematic externalizing behaviors. Items were rated on a scale of one (*never*) to four (*very often*). In K and first grade, the externalizing scale included five items that rated the frequency with which a child argues, fights, gets angry, acts impulsively, and disturbs ongoing activities. A sixth item was added in third grade asking about the frequency with which a child talks during class time (α_1=.90 α_2=.86, α_3=.89). These items were standardized to maintain consistency over time.

2.2.4 Approaches to learning

Children's Approaches to Learning (ATL) were also assessed using a subscale of the SRS. The ATL subscale asks teachers to rate children's behaviors that may affect the ease with which children can benefit from the learning environment. It includes items that rate the child's attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization. Items are rated on a 4-point scale ranging from 1 (*never*) to 4 (*very often*). The overall Approaches to Learning score is the mean rating on the subscale's six items (α_1=.89 α_2=.89, α_3=.91).

2.2.5 Instruction

This study considers whether three aspects of instructional practices – time, structure, and pedagogical approach – as pathways through which classroom misbehavior may shape learning. Instructional measures were obtained from teacher reports in spring of K, first, and third grades, and were taken separately for both reading and math (U.S. Department of Education, National

Center for Education Statistics, 2001). Previous investigations find that end-of-year surveys of instructional approach are highly correlated with classroom observations of frequency of instructional practices (*r*s ranging from .6 to .8) (Porter, Kirst, Osthoff, Smithson, & Schneider, 1993).

The instructional time measures came from teachers' report of the number of minutes per day and times per week they "typically" spend teaching either math or reading. Teachers reported times per 5 day school-week of math and reading instruction on a five-point scale: *never, less than once/week, 1-2 times/week, 3-4 times/week,* and *daily*. Teachers also reported minutes per day of math or reading time on a four-point scale: *1-30 min/day, 31-60 min/day, 61-90 min/day,* and *more than 90 min/day*. A midpoint was assigned for each of these variables to meaningfully represent the approximate number of days per week and hours per day each subject was taught. These measures were then multiplied together to form a variable that represents the number of hours per week teachers report spending on math or reading instruction.

Classroom structure measures were derived from teachers' reports of the number of times per week (*never, less than once per week, 1-2 times per week, 3-4 times per week, daily)* and amount of time per day (*1-15 min/day, 16-30 min/day, 31-60 minutes/day,* and *more than 60 min/day)* they divide their classrooms into small instructional groups for math and reading activities or lessons. As before, midpoints were assigned to meaningfully represent the approximate number of times per week and hours per day teachers utilized small groups. These measures were then multiplied together to form a variable that represents the approximate amount of hours per week teachers report dividing their class into small groups for math or reading.

Pedagogical approach measures were created from teachers' reports of the frequency of their instructional practices. An exploratory factor analyses was conducted for the purposes of this study. Based on the literature on direct and constructivist instructional approaches, consultation with instruction specialists in both reading and math (R. Bean, personal communication, June 16, 2010; P. Smith, personal communication, June 15, 2010), and guided by factor loadings, two scales were identified for both math and literacy instruction. Instructional measures came from the teacher questionnaire, in which the teacher was asked to report how often specific curricular and instructional activities took place in the classroom. Each item was standardized, and composite variables were created based on the mean. Although the questionnaire changed between first and third grade to reflect grade-wise changes in instructional approach, composites were designed to maintain as much consistency as possible across waves. Higher values on each of these composite measures of instruction represent more frequent use of the particular approach.

Reading scales include standardized measures of both direct and constructivist techniques. The constructivist instruction scales (e.g., invented spelling, projects or activities, independent reading) include 15 items in Kindergarten and first grade and 11 items in third (α_k=.84, α_1=.79, α_3=.67). See Appendix A for items included in the constructivist instruction composite. The direct instruction scales (e.g., teaching phonics, conventions of print, letter recognition) include 13 items in Kindergarten and first grade, and six items in third grade (α_k=.71, α_1=.71, α_3=.67). See Appendix B for items included in the direct instruction composite.

The mathematics scales include standardized measures of both reform and traditional techniques. The reform math scales (e.g., math games, solving real life problems, using creative movement for math) include 17 items in kindergarten and first grade, and 12 in third grade

(α_k=.87, α_1=.85, α_3=.75). See Appendix C for items included in the reform math scale. The traditional math scales (e.g., adding single digit numbers, writing numbers between 1 – 100, using math textbooks) included 16 items in kindergarten and first grade, and 9 in third grade (α_k=.81, α_1=.84, α_3=.60). See Appendix D for items included in the traditional math scale.

2.2.6 Child characteristics

A variety of time-invariant child characteristics were assessed in kindergarten, and were included in the random-effects models. Covariates included an indicator of whether the child was male, and parent report of the child's race/ethnicity (non-Hispanic White (reference), non-Hispanic African American, Hispanic, Asian, American Indian/native-Hawaiian/Pacific Islander, and non-Hispanic multi-racial). An item representing children's cognitive abilities upon entry to kindergarten was obtained from the Fall of Kindergarten IRT scores for math and reading. The date of this assessment was also included as a control variable. Child birthweight was represented with an indicator of whether the child was born less than 5 pounds, 8 oz. A dichotomous indicator of whether the child had repeated kindergarten was also included as a covariate.

2.2.7 Family characteristics

Several maternal and household characteristics were also included as covariates, including marital status, employment, and family structure. Marital status was measured with a series of variables indicating whether children lived in a household with a mother who was married (reference), separated/divorced, or never married/widowed. Mother's employment status

was also included, and indicated whether she was employed more than 35 hours per week (*full-time* – reference), less than 35 hours per week (*part-time*), unemployed but looking for work, or unemployed but not in the labor force. If the child's mother no longer lived in the home, the father's marital and employment statuses were used instead. A continuous variable indicated the number of children under the age of 18 who lived in the home. These items were assessed at kindergarten, first, and third grades, and were included as control variables in both fixed and random-effects models. Several time-invariant characteristics were also included as covariates in random-effects models, including a dichotomous indicator capturing whether the primary language of the household was non-English, and the mother's age at the birth of her first child. If the child's mother no longer lived in the home, the father's age was used instead.

This study also controlled for two dimensions of learning-related parenting variables: cognitive stimulation, and parent involvement in the school. The cognitive stimulation composite is based on 6 questions about different types of learning activities that were asked to parents across all time points. In kindergarten, first, and third grades, parents were asked to rate the frequency, on a scale from 1 to 4 (1 = *not at all* and 4 = *3 to 6 times a week*), with which children engaged in particular learning activities in the home (*reading books*) and outside of the home (*trips to the library, extracurricular art classes,* and *other classes*). An item indicating the number of books the child owned was also included. Cognitive stimulation composite scores were calculated by taking the standardized mean of the 6 items for kindergarten, first grade, and third grade (α_k=.55, α_1=.55, α_3=.49). The parent involvement composite consists of seven items reflecting the degree to which parents have contacted the school, attended school and classroom activities such as open house, PTA meetings, parent-teacher conferences, and school events, participated in fundraising activities, and acted as a school volunteer. Composites measures were

created by averaging the standardized means of the 7 items asked in kindergarten, first, and third grades (α_k=.57, α_1=.59, α_3=.58).

Variables representing children's socioeconomic status were entered as covariates, and included parental education, income, and occupational prestige. Mothers' highest level of education represented those who had completed less than four years of high school, those who had graduated from high school, who had completed vocational or technical programs, who had graduated college, and who had earned advanced degrees (reference). If the child's mother was missing an education score, the other parent's highest education obtained was used. As prior work has shown that income matters more for families with fewer resources (Votruba-Drzal, 2003: Votruba-Drzal, 2006), family income was measured using the natural log of a continuous annual income variable. This item was computed for when the child was in kindergarten, first, and third grade. Finally, the highest level of parents' occupational prestige was measured by a prestige score based on the reported occupation of parents who were involved in the labor force. These scores were recoded to reflect the average of the 1989 General Social Survey (GSS) prestige score of the occupation (Nakao & Treas, 1992 as cited in U.S. Department of Education, National Center for Education Statistics, 2001). If one parent was missing a prestige score, the other parent's prestige score was used. Occupational prestige scores were computed for when the child was in kindergarten, first grade, and third grade.

2.2.8 Child characteristics

Several time-varying characteristics of the children's classrooms are also included in both random- and fixed-effects analyses as control variables (U.S. Department of Education, National Center for Education Statistics, 2001). Continuous variables representing class size and teachers'

total years of experience were included, as was a dichotomous variable representing whether a teacher had a bachelor's or an advanced degree (reference). Classroom characteristics were collected in the spring of kindergarten, first, and third grade.

Principals' reports of school characteristics were included as aggregate measures of school disadvantage. School characteristics displayed little variation across grades (*r*s = .66 - .96), and were therefore only used as controls in random-effects models. They included a continuous measure of the size of the school, the percent of children registered for free or reduced-priced lunch, a dummy variable indicating whether the school qualifies for Title-I assistance, and a dichotomous variable representing whether the school is public (reference) or private. School characteristics were collected in the spring of kindergarten, first, and third grade.

3.0 RESULTS

3.1 DESCRIPTIVE STATISTICS

Descriptive statistics for the analytic sample can be found in table 1, while stacked correlations can be found in table 2. Across all grades, teachers reported a moderate amount of misbehavior in their classrooms (M = 2.54; SD = .89), but only 18% noted they had one or more child with an SED in their classroom (M = .21; SD=.41). An examination of the grade-level items suggests that reports of classroom misbehavior did not change substantially between kindergarten and 3rd grade. However, slightly more classrooms had at least one child with a SED in 3rd grade (M=.28; SD=.45) than in kindergarten (M =.11; SD=.43; t(273,878)=110.85; p=.001; *d*=.42) or 1st grades (M =.11; SD=.43; t(273,878)=83.12; p=.002; *d*=.31).

Table 1. Descriptives

	Kinder Mean (SD)	1st Grade Mean (SD)	3rd Grade Mean (SD)
Direct Assessment			
Time of Spring Assessment	0 (0)	11.98 (.69)	35.80 (.81)
Quadratic Time of Spring Assessment	0 (0)	143.98 (16.57)	1282.40 (57.77)
Math IRT	31.91 (11.54)	55.09 (15.93)	84.791 (17.87)
Reading IRT	38.65 (13.46)	68.24 (20.70)	107.599 (20.33)
Math IRT - Fall of Kindergarten	21.77 (9.02)	-	-
Reading IRT - Fall of Kindergarten	27.21 (10.23)	-	-
Child Characteristics			
Male	.50 (.49)	-	-
Low birthweight	.07 (.26)	-	-
Repeated kindergarten	.04 (.21)	-	-
English is not first language	.09 (.28)	-	-
Race/Ethnicity			
Caucasian - Non-Hispanic	.57 (.49)	-	-
African American - Non-Hispanic	.09 (.29)	-	-
Hispanic	.09 (.29)	-	-
Asian	.03 (.19)	-	-
Native American/Alaskan/Pacific Islander	.02 (.15)	-	-
Multi-racial - Non-Hispanic	.02 (.15)	-	-
Socioeconomic Status			
Linear Income	10.49 (.92)	10.57 (.90)	10.65 (.89)
Occupational Prestige	45.98 (11.77)	45.97 (11.68)	45.86 (11.80)
Maternal Highest Education			
Advanced Degree	.12 (.32)	.12 (.32)	0.14 (.34)
Bachelors Degree	.21 (.41)	.21 (.41)	0.22 (.42)
Vocational Degree	.32 (.47)	.33 (.47)	.34 (.47)
High School Degree	.25 (.43)	.24 (.42)	.21 (.41)
Less than High School Degree	0.10 (.30)	.10 (.30)	.09 (.29)
Home Characteristics			
Number of Kids in Home	2.51 (1.18)	2.54 (1.17)	2.53 (1.14)
Maternal Employment			
Full Time	.46 (.49)	.48 (.50)	.50 (.50)
Part Time	.22 (.41)	.22 (.41)	.23 (.42)
Unemployed - Looking for Work	.03 (.18)	.03 (.16)	.03 (.17)
Unemployed - Not in Workforce	.28 (.45)	.27 (.44)	.23 (.42)
Maternal Marital Status			
Married	.73 (.45)	.73 (.44)	.74 (.44)
Separated/Divorced	.13 (.34)	.14 (.34)	.16 (.37)

Table 1 (continued)

Never Married/Widowed	.14 (.35)	.13 (.33)	.10 (.31)
Learning-Related Parenting Behaviors			
Cognitive Stimulation	.02 (.72)	.06 (.81)	-0.07(.88)
Parental Involvement in the School	-.05 (.65)	-.06 (.90)	.14 (.99)
Classroom Characteristics			
Teacher has a BA	.64 (.48)	.63 (.48)	.60 (.49)
Years Teaching Experience	13.15 (9.5)	13.44 (10.2)	15.06 (10.26)
Class Size	20.70 (5.24)	20.95 (4.64)	21.26 (5.25)
School Characteristics			
Title 1 Status	.61 (.49)	.65 (.48)	.65 (.48)
Percent Free/Reduced Lunch	37.08 (29.41)	35.35 (29.53)	39.16 (30.93)
Private School	.21 (.41)	.20 (.40)	.19 (.39)
School Size	487.970	529.15	515.88
Behavioral Characteristics			
Child Externalizing Behaviors	1.64 (.62)	1.64 (.62)	1.70 (.60)
Classroom Misbehavior	2.46 (.90)	2.54 (.90)	2.46 (.87)
At Least One Child with an SED	.12 (.32)	.15 (.36)	.28 (.45)
Mediators			
Child Mediator			
Approaches to Learning	3.14 (.67)	3.06 (.70)	3.04 (.68)
Math Instruction			
Reform	.00(.55)	.00 (.54)	.00 (.54)
Traditional	.00 (.48)	.00 (.51)	.00 (.46)
Time in Math Groups	1.81 (.98)	2.53 (1.01)	2.25 (1.02)
Instructional Time - Math	6.83 (3.05)	8.99 (2.52)	9.15 (2.63)
Reading Instruction			
Constructivist	.00 (.57)	.00 (.53)	.00 (.48)
Direct	.00 (.46)	.00 (.47)	.00 (.66)
Time in Reading Groups	2.21 (1.11)	3.33 (.91)	2.75 (1.09)
Instructional Time - Reading	10.16 (3.77)	13.72 (2.90)	12.42 (3.48)

Table 2. Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Math IRT	1															
2. Reading IRT	.908**	1														
3. Time of Assessment	.803**	.826**	1													
4. Quadratic Time of Assesment	.760**	.785**	.973**	1												
5. Externalizing Behaviors	-.074**	-.074**	.049**	.050**	1											
6. Classroom Misbehavior	-.099**	-.093**	-.026**	-.035**	.189**	1										
7. One or More Child with an SED	.118**	.121**	.197**	.193**	.054**	.073**	1									
8. Approaches to Learning	.201**	.193**	-.057**	-.048**	-.558**	-.165**	-.051**	1								
9. Reform	.014**	.002**	.013**	.011**	.007**	-.079**	.033**	.017**	1							
10. Traditional	.037**	.034**	.000	-.006**	-.006**	-.060**	-.001**	.028**	.546**	1						
11. Time in Groups - Math††	.090**	.090**	.127**	.069**	.032**	-.003**	.052**	-.063**	.181**	.094**	1					
12. Instructional Time - Math††	.252**	.252**	.287**	.228**	.033**	.009**	.067**	-.033**	.209**	.179**	.197**	1				
13. Constructivist	.008**	.006**	-.005**	-.008**	-.007**	-.114**	.033**	.027**	.575**	.333**	.156**	.147**	1			
14. Direct	-.012**	-.008**	-.002**	-.006**	-.010**	-.052**	.006**	.018**	.414**	.354**	.149**	.122**	.430**	1		
15. Instructional Time - Reading††	.184**	.189**	.186**	.100**	.015**	.003**	.024**	-.019**	.094**	.086**	.143**	.572**	.168**	.097**	1	
16. Time in Groups - Reading††	.100**	.104**	.122**	.030**	.039**	.026**	.053**	-.064**	.116**	.064**	.631**	.213**	.139**	.119**	.274**	1

† Correlations weighted by C245cw0 †† Hours per week

3.2 CLASSROOM MISBEHAVIOR AND ACHIEVEMENT

Tables 3 and 4 present child random-effects (RE) and fixed-effects (FE) results for math and reading, respectively. RE models are presented in models 1(a) – 4(a), followed by FE estimates presented in models 1(b) – 4(b). Patterns of results were fairly consistent across both random- and fixed-effects models. In general, FE coefficients were smaller.

Table 3. Child Fixed- and Random-Effects Predicting Math Achievement

Variables	Math: Random Effects								Math: Fixed Effects							
	Model 1a		**Model 2a**		**Model 3a**		**Model 4a**		**Model 1b**		**Model 2b**		**Model 3b**		**Model 4b**	
	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*
Disruptive Behaviors																
Classroom Misbehavior	-.572***	*.034*	-.475***	*.036*	-.410***	*.035*	-.373***	*.035*	-.425***	*.093*	-.388***	*.094*	-.386***	*.094*	-.348***	*.094*
One or More Child with an SED	-.666**	*.184*	-.652**	*.186*	-.698**	*.191*	-.707**	*.198*	-.390	*.261*	-.391	*.262*	-.393	*.262*	-.411	*.264*
Externalizing Behaviors			-1.194***	*.047*	-.132†	*0.072*	-.157†	*.072*			-.601**	*.187*	-.564**	*.199*	-.593**	*.197*
Child Mediator																
Approaches to Learning					2.355***	*0.086*	2.32***	*.084*					.094	*.167*	.051	*.166*
Instructional Mediators																
Reform							-.274**	*0.074*							-0.191	*.188*
Traditional							1.37***	*.112*							1.216***	*.210*
Time in Groups - Math							-.055†	*.027*							.012	*.077*
Instructional Time - Math							.137***	*.012*							.122***	*.029*

† $p \leq .10$. *$p \leq .05$. **$p \leq .01$. *** $p \leq .001$

Table 4. Child Fixed- and Random-Effects Predicting Reading Achievement

Variables	Reading: Random Effects								Reading: Fixed Effects							
	Model 1a		**Model 2a**		**Model 3a**		**Model 4a**		**Model 1b**		**Model 2b**		**Model 3b**		**Model 4b**	
	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*
Disruptive Behaviors																
Classroom Misbehavior	-.700***	*.067*	-.564***	*0.072*	-.423***	*.068*	-.393***	*.070*	-.648***	*.133*	-0.615***	*.136*	-.583***	*.136*	-.539***	*.138*
One or More Child with an SED	-1.175***	*.201*	-1.154***	*.202*	-1.240***	*.219*	-1.224***	*.226*	-.746*	*0.330*	-.747*	*.331*	-.775*	*.333*	-.771*	*.335*
Externalizing Behaviors			-1.618***	*0.107*	.471**	*.119*	.433**	*.121*			-0.543†	*.292*	-.111	*.299*	-.179	*.302*
Child Mediator																
Approaches to Learning					4.501***	*0.059*	4.475***	*.056*					1.114***	*.223*	1.068***	*.222*
Instructional Mediators																
Reform							.158	*.100*							0.474†	*.271*
Traditional							.193	*.116*							.046	*.242*
Time in Groups - Reading							.078	*.050*							.180	*.114*
Instructional Time - Reading							.136***	*0.014*							0.123***	*.032*

† $p \leq .10$. *$p \leq .05$. **$p \leq .01$. *** $p \leq .001$

Main effects of classroom misbehavior before accounting for children's individual externalizing difficulties are presented in models 1(a) and (b). Consistent with expectations, both classroom misbehavior and the presence of one or more children identified with an SED were negatively associated with children's early math achievement. Across both RE and FE models, a one-unit increase in misbehavior was associated with .425 to .572 point drop in children's math achievement. The presence of one or more children with an SED was also associated with between .390 and .666 point decrease in children's math achievement, although this was only significant in RE models.

Children's externalizing behaviors were stepped into Models 2 (a) and (b). The addition of this variable attenuated the misbehavior coefficient by 9 to 17%, and the SED coefficient by approximately 2%. Class misbehavior continued to be associated with lower levels of math achievement (*B*s range from -.388 to -.475) across both RE and FE models. Children in classrooms with those identified with an SED also continued to achieve less well in math RE models (*B*=-.652). Models 1 and 2 in Table 4 show similar patterns for reading achievement. Again, both class misbehavior and the presence of one or more children identified with an SED were negatively associated with children's early reading achievement. Although accounting for children's externalizing difficulties attenuated the misbehavior coefficient by 5 – 19%, a one-point increase in class misbehavior was consistently associated with a .564 to .700 point drop in children's reading achievement across RE and FE models, respectively. The presence of one or more child identified with an SED also remained negatively and significantly associated with children's math achievement across both RE and FE specifications, even after stepping in externalizing behaviors (*B*s range from -.746 to -1.175).

3.3 APPROACHES TO LEARNING AND ACHIEVEMENT

To determine whether children's Approaches to Learning (ATL) are a pathway through which classroom misbehavior is associated with children's achievement, the ATL variable was stepped into models 3 (a) and (b). Math findings are presented in table 3. ATL significantly predicted children's math achievement in RE, but not FE, models, and attenuated the link between class behavior and math achievement by approximately 14%. Specifically, a one-point increase in ATL was related to a 2.355-point increase in children's math achievement, relative to their peers. As expected, Sobel tests (Sobel, 1982) demonstrate that children's ATL partially mediated the association between classroom misbehavior and children's math achievement. Specifically, higher rates of misbehavior was linked to significantly less adaptive ATL (*B*= -.025), which was associated with less math achievement. An unexpected but significant partial suppression effect emerged for children in classrooms with SEDs, where the presence of one or more children with an SED was associated with a significant *increase* in children's ATL across both RE and FE models (*B*s range from .017 - .024). In turn, this was associated with better achievement.

As seen in Table 4, findings were similar for reading - though associations between ATL and reading achievement were robust across RE and FE models. Here, ATL was positively related to children's reading skills (*B*s range from 1.114 to 4.501), and attenuated the link between classroom misbehavior and reading achievement by 5 - 25%. Sobel tests again found that ATL partially mediated the relationship between behavior and achievement. Here, higher rates of misbehavior were associated with less adaptive ATL (*B*s = .026), which was problematic for children's reading achievement. An unexpected but significant partial suppression effect again emerged for children in classrooms with SEDs in both RE and FE models, where the

presence of children with an SED was associated with a .018 to .026 point increase in children's ATL across both RE and FE models. In turn, this was associated with better achievement.

3.4 INSTRUCTIONAL MEDIATION

Models 4(a) and (b) consider whether classroom instructional characteristics further mediate the link between classroom misbehavior and academic achievement, above and beyond children's externalizing behaviors and ATL. Math findings are presented in Table 3. Results revealed that the addition of instructional variables attenuated the class behavior coefficient by approximately 9 to 10%. Specifically, both math instructional time and traditional math instruction were positively and significantly associated with math achievement (*B*s range from .137 to 1.37), and across both FE and RE models. Reform math and use of small groups were also negatively associated with children's math achievement, but only in RE models (*B*s = -.274 & -.055, respectively). Consistent with expectations, higher ratings of class misbehavior predicted less reform and traditional pedagogical approaches, instructional time, and small group instruction (*B*s range from -.035 to -.066). Sobel tests demonstrate that traditional instruction partially mediated the association between class behavior and children's math achievement in both RE and FE models, while instructional time played a partial mediational role in RE models only. Specifically, a one-unit increase in misbehavior was associated with a .035 - .036 unit decrease in traditional instruction, and .059 of an hour, or 3.54 minute decrease in weekly math instruction. Reform instruction played a partially suppressive role in RE models, where less reform math was actually beneficial for children's achievement when they were in classrooms with greater amounts of misbehavior.

Addition of the math instruction variables increased the SED coefficient by approximately 1%. Unexpectedly, the presence of one or more child identified with an SED was significantly and positively associated with reform instruction in both FE and RE models. Sobel tests indicate that reform math played a partially suppressive role in the association between the presence of children with an SED and child achievement, but in RE models only. Specifically, students in classrooms with those identified with SEDs were exposed to .036 to .037 units *more* reform-based instruction, which was problematic for their achievement.

Reading findings are presented in Table 4. Results revealed that the addition of instructional variables attenuated the classroom misbehavior coefficient by approximately 7%. Here, time spent on reading instruction positively predicted children's achievement across both RE and FE models (*B*s range from .123 to .136). Tests of mediation suggest that instructional time partially explained the association between classroom misbehavior and children's math achievement, but only at the trend level (p=.07). Specifically, a unit increase in misbehavior was related to .075 hours, or 4.5 minutes less reading instruction per week, which was linked to lower reading achievement. Although higher ratings of class misbehavior negatively predicted all other forms of instructional characteristics, no other indirect paths were significant.

Addition of the reading instruction variables attenuated the SED coefficient by approximately 1%. In RE models, having classmates identified with an SED was negatively associated with reading instructional time, and positively associated with constructivist reading instruction. Although constructivist instruction did not emerge as a significant mediator, instructional time did partially mediate the association between children in classrooms with SEDs and underachievement in RE models. Specifically, the presence of classmates with SEDs

was negatively associated with approximately .176 hours, or 10.56 minutes less reading instructional time per week, which was problematic for children's reading achievement.

4.0 DISCUSSION

Using data from a nationally representative sample, this study examined whether classroom misbehavior is associated with reading and math achievement from Kindergarten through 3rd grade. Furthermore, it considered differences in children's approaches to learning and teachers' instructional practices as pathways through which misbehavior influences learning. This analysis found that measures of misbehavior were negatively and significantly associated with children's academic skills. When compared to a child in a classroom with other children who "occasionally" misbehave, children with classmates that "frequently" misbehave and are "often difficult to handle" consistently performed between 9% and 15% of a standard deviation worse in both math and reading, even after accounting for individual externalizing behaviors. However, those who shared a classroom with at least one child with an SED underperformed by only 1% of a standard deviation. Although this finding was robust across reading models, having classmates with SEDs only negatively predicted math achievement in the random effect model specification.

These results suggest that misbehavior in classrooms can be harmful to academic development during the formative years of children's education. Creemers' dynamic model of educational effectiveness argues that children's characteristics shape the proximal environments in which they learn, which in turn can affect the development of others within those contexts (Creemers & Kyriakidis, 2008). This framework is consistently supported by the current study's

results, which suggest that the behavioral skills of children in a classroom may affect their peers' learning. Findings are robust even after controlling for a host of time-variant and invariant child, family, and school characteristics, as well as individual externalizing behaviors. If increasing levels of class misbehavior are also associated with increases in children's externalizing behaviors, controlling for individual children's externalizing behaviors may have actually produced results that were overly conservative.

4.1 APPROACHES TO LEARNING AND ACHEIVEMENT

Consistent with our expectations, the current study's findings provide support for the possibility that class misbehavior is harmful for children's achievement by negatively influencing their ATL. Our results corroborate past literature suggesting that children who display less adaptive ATL underperform relative to their peers in both math and reading (Li-Grining, Votruba-Drzal, & Maldonado-Carreno, 2010; McClelland, Morrison, & Holmes, 2000; McClelland Acock, & Morrison, 2006). Social learning theory posits that children learn novel behaviors by observing others (Bandura & Walters, 1963). As such, children may acquire less adaptive learning-related behaviors from their misbehaving classmates by modeling their behavior. Indeed, prior research has shown that students who perceive their peers to be academically motivated and engaged are more likely to show more adaptive ATL (Wentzel, Battle, Russell, & Looney, 2010). Misbehavior may pose a particular challenge for elementary school children, who may have difficulty drawing upon effective ATL and self-regulatory strategies in the face of distraction. Finally, it is possible that children in classrooms with higher

levels of misbehavior are more prone to teasing, bullying, or rejection by their peers, which may in turn compromise their ability to attend to teachers and learning activities in the classroom.

Contrary to expectations, children with classmates with SEDs seemed to display more adaptive ATL than their peers. Although this finding was surprising, it may be the case that experienced and more highly educated teachers are more adept at identifying children with SEDs (Mashburn & Henry, 2004). These teachers are also better able to handle challenging behavior (Borg & Falzon, 1998; Kokkinos, Panayiotou, & Davazoglou, 2005), and may be more skilled at delivering effective instruction and promoting ATL even with more behaviorally demanding students. Children with SEDs often have Individualized Education Plans (IEPs) that provide them with a variety of additional resources such as smaller classrooms, teacher-aids, and learning specialists that provide supplemental support (IDEA Amendments of 1997). If these additional supports decrease student-teacher ratios and bring more experienced instructors into the classroom, they may also promote ATL for the class as a whole (Koth, Bradshaw, & Leaf, 2008). Children who have classmates with SEDs may therefore learn in classrooms that are more effective at promoting adaptive ATL.

Not only were children's ATL an important pathway through which classroom misbehavior influenced student achievement, but there was also some evidence to suggest that individual children's externalizing problems were important in explaining links between misbehavior and achievement. Children's externalizing problems were included as a control in the model to provide a more rigorous test of the association between classroom misbehavior and achievement, and were not directly considered as a mediator. However, it is interesting to note that the addition of children's externalizing problems to the models attenuated the coefficients on classroom misbehavior. This suggests that misbehavior within classrooms may independently

contribute to changes in children's own behavior problems. This is consistent with prior research showing that children who interact with aggressive peers display increases in their own aggressive behavior (Hanish, Martin, Fabes, Leonard, & Herzog, 2005). If classroom misbehavior displays this "contagion effect" (Dishion & Tipsord, 2011), increases in individual externalizing behaviors may in fact play a mediating role (Sandstrom, Cillessen, & Eisenhower, 2003).

4.2 INSTRUCTIONAL MEDIATION

Teachers' instructional practices emerged as an additional pathway by which class misbehavior was associated with children's achievement. As expected, children who "frequently misbehaved" and were "often difficult to handle" experienced less instructional time than those in classrooms that "occasionally" misbehaved. More specifically, "frequent" misbehavior was associated with a loss of approximately 3 minutes of math and reading instruction per day. Although seemingly minor, a 3-minute loss of instructional time compounds to approximately 9 hours less reading and math instruction per 180-day academic year. For the average school in our data, this corresponds with an annual loss of approximately 3 – 5 days of reading, and 4 - 8 days of math instruction. Further, the presence of children with SEDs was associated with an additional loss of approximately 11 minutes of reading time per week, or nearly 6 ½ instructional hours per year. These findings align with Lazear's (2001) assertion that classroom misbehavior likely attenuates student learning by forcing teachers to allocate more time to managing misbehavior in lieu of instruction.

A notable finding was that traditional math instruction emerged as a partial mediator. Teachers in classrooms with higher levels of misbehavior provided less traditional math instruction, which was worse for math performance. This finding supports the notion that systematic, rigorous, content-driven pedagogical approaches may be more difficult to implement in the face of misbehavior. Although both misbehavior and the presence of children with SEDs were also associated with less reform math instruction, this surprisingly resulted in better math performance. This is not altogether inconsistent with prior research, which suggests that reform approaches may be less beneficial for children's math achievement during elementary school when compared to middle-school (Bodovski & Farkas, 2007; Gamoran, 2001; Shouse, 2001). As such, reform instruction may be negatively associated with children's achievement in the elementary school grades, while children are developing basic math skills and regulatory abilities. Further investigation is needed to determine whether reform instruction emerges as a mediator in later years, once children are called upon to utilize higher-order problem solving skills.

In contrast with math, literacy instructional approach did not significantly mediate the association between class misbehavior and reading achievement. Many teachers of mathematics at the elementary school level have relatively weak academic backgrounds in the subject, and express some level of math anxiety (Brady & Bowd, 2005). If teachers are better prepared and more comfortable teaching reading and language arts, they may also be more comfortable with and skilled at implementing consistent instructional strategies. As such, teachers' reading instructional approach may be less apt to change - even in the face of misbehavior.

Together, the results of this study suggest that the ability of one student to access and benefit from classroom instruction may in part depend on the behavior of others in the class.

Integration of the bioecological model with Creemers' model of educational effectiveness suggests that children's characteristics create a classroom environment through multiple levels of learning-related processes (Bronfenbrenner & Morris, 1998; Creemers & Kyriakidis, 2008). This study's findings support both models, suggesting that classroom misbehavior is related to both child-level ATL and classroom-level instructional processes - especially the amount of instruction that children experience in reading and math. The bioecological model further posits that multiple levels of processes drive the academic development of all children within shared environments. Our findings again support this framework, as class misbehavior relates to learning through children's ATL and teachers' classroom instruction.

4.3 LIMITATIONS

While the current investigation has many strengths, including the use of a large, nationally representative dataset, there are also several limitations that provide direction for future research. First, teacher report was used to measure the presence of misbehavior within a classroom. Although teachers are reliable reporters of individual students' externalizing behavior (Phares, 1997; Rescorla et. al., 2007), it is impossible to know how accurate the more global measure of classroom misbehavior is in this study. For instance, teachers who rate their classrooms as better behaved may do so in part because they are more competent and effective. These teachers may be better at eliciting and sustaining their students' attention on instructional activities and tasks despite misbehavior, and may therefore have students with more adaptive ATL. Higher quality teachers may also be able to adjust instructional techniques to suit students' individualized needs, rather than in response to the behavioral characteristics of the classroom.

Second, although this study controlled for numerous time-varying and time-invariant child, family, household, classroom, and school covariates with both random- and fixed-effects models, the threat of omitted variable bias cannot be ruled out entirely.

Despite these limitations, it is important to note that study's measures are substantially more direct than those used in previous investigations (e.g., Figlio, 2007; Hoxby, 2001; McKee, Rivkin, & Simms, 2010). However, future research can be further strengthened by utilizing observational assessments and multi-informant measurement tools (e.g., the Child Behavior Checklist; Achenbach, 1991) to more accurately assess classroom behavior. Additional work considering whether teacher quality or expertise in part explains the associations between class misbehavior and child achievement is also warranted.

4.4 IMPLICATIONS FOR FUTURE RESEARCH

This study illustrates that children's behavioral abilities are not only important for individual academic achievement (Raver, 2002), but also for the academic gains of others within their classroom. Indeed, researchers, parents, teachers, and students alike have consistently asserted that class misbehavior presents a risk for academic underachievement (Figlio, 2007; Fletcher, 2009; Hoxby, 2000; Schools and Staffing Survey, 2000). However, the small body of research that has examined this link has been limited by indirect measures of misbehavior that lack specificity and are heavily reliant on small and localized samples that do not allow for generalization. Although the current study represents an improvement over this prior research, several important questions remain.

First, future research should look more carefully at whether associations between classroom misbehavior and student achievement differ depending on the timing of children's exposure to misbehavior in the classroom. Prior evidence from the literature on environmental stress and child development suggests that children who are exposed to early, chronic stressors (e.g., poverty; poor housing conditions) are more at-risk than those who are experience stress later in life (Dearing, 2008; Duncan & Brooks-Gunn, 2000; Evans & English, 2002). If classroom misbehavior is similarly stressful for children, it is possible that early exposure to misbehavior is exponentially more problematic than later exposure.

Second, additional research may consider whether children's achievement depends more on the severity of classmates' misbehavior, or on the overall behavioral composition of the classroom. For instance, it is unclear whether having a few severely misbehaving classmates is as bad for children's achievement as having many classmates who occasionally misbehave. Unfortunately, our analysis was unable to consider this possibility because it requires more complete data about classmates' behavior than was available. Additional research utilizing detailed assessments of all students' behaviors within a classroom is needed to address these issues.

Third, further investigations should consider a wider variety of classroom behaviors. For instance, children who are anxious or depressed often engage in co-ruminative exchanges (Rose, 2002) that can be detrimental to their peers' approaches to learning and academic achievement (Altermatt & Broady, 2009). However, internalizing behaviors may not interfere with instructional processes because they often go un-noticed by teachers (Gresham & Kern, 2004). As such, it may be important to delineate the effects of aggregate classroom internalizing from externalizing behaviors. Conversely, it may also be important to examine how aggregate

positive classroom behaviors relate to children's achievement. For instance, adolescents who spend time with those who participate in class activities, hold positive achievement-related beliefs, and exhibit prosocial helping behaviors tend to display more engagement, and achieve more over time (Altermat & Broady, 2009). However, more research is needed to determine whether this association holds true in elementary school.

Fourth, additional research is needed to determine whether misbehavior is more problematic for subgroups of children who are at increased risk for behavior problems or underachievement. Children facing high-risk circumstances (e.g., poverty, suboptimal parenting, ADHD or Learning Disorder diagnoses) are more likely to maintain or regain normative developmental trajectories if they have access to at least one context that is perceived as positive, caring, safe and comfortable (Brody, Dorsey, Forehand, & Armistead, 2002; Simmons & Blyth, 1987). Organized, predictable, and well-regulated classroom and instructional experiences promote self-regulation, socioemotional adjustment, and academic achievement, and can serve as a source of resilience for at-risk children (Brody, Dorsey, Forehand, & Armistead, 2002; Georges, 2009). If such students are exposed to elevated levels of classroom misbehavior, these associations may be compromised.

Finally, future investigations may wish to examine how classroom misbehavior relates to student achievement through teacher stress and burnout. Teachers in stressful classrooms report higher levels of emotional exhaustion, lower morale, a tendency to depersonalize and distance themselves from their students, and feelings of professional inadequacy (Figlio, 2007; Lambert, McCarthy, O'Donnell, & Wang, 2009). Such teachers may also utilize harsher disciplinary tactics to manage their class, have less positive student-teacher relationships, and maintain lower

expectations of their students (Konishi, Hymel, Zumbo, & Li, 2010). This can also be problematic for children's achievement (Wentzel, Battle, Russel, & Looney, 2010).

4.5 CONCLUSION

The results of this study represent a first step towards understanding the child- and classroom- processes that are related to the association between classroom misbehavior and children's academic achievement. An imperative next step is to determine whether observational and independent measures of misbehavior are still associated with children's achievement, or whether teachers' perceptions of children's misbehavior primarily drive findings. It may also be beneficial to identify which classrooms are the most at risk of misbehavior, and seek to intervene before they become so. In our current economic climate of fiscal cuts to education and social services, this information may help administrators and policy makers direct increasingly limited resources and interventions towards the most at-risk classrooms and students.

APPENDIX A

CONSTRUCTIVIST READING INSTRUCTION

Table 5. Constructivist Reading Instruction

Constructivist Items	Grade		
	K a=.84	First a=.79	Third a= .67
Dictate stories to teacher	✓	✓	
Retell stories	✓	✓	
Write with invented Spelling	✓	✓	
Publish Writing	✓	✓	
Perform plays and skits	✓	✓	
Peer Tutoring	✓	✓	
Identifying Main idea	✓	✓	
Making Predictions based on text	✓	✓	
Communicating complete ideas orally	✓	✓	
Remembering and following directions	✓	✓	
Read aloud fluently	✓	✓	
Do project/activity related to book or story	✓	✓	✓
Read books they've chosen themselves	✓	✓	✓
Independent (silent) reading	✓	✓	✓
Write stories in journal	✓	✓	✓
Discuss or comment on others' writing			✓
Explain or support understanding of reading			✓
Talk with each other about what they've read			✓
Discuss interpretations of what they've read			✓
Write about something they've read			✓
Choose topic to write about			✓
Use library resources			✓

APPENDIX B

DIRECT READING INSTRUCTION

Table 6. Direct Reading Instruction

Direct Items	Grade		
	K a=.71	First a=.71	Third a=.67
Alphabetizing skills	✓	✓	
Conventional Spelling	✓	✓	
Conventions of print	✓	✓	
Letter Recognition	✓	✓	
Matching letters to sounds	✓	✓	
Writing own name	✓	✓	
Rhyming words and word families	✓	✓	
Common prepositions (over, under)	✓	✓	
Work in reading workbook or worksheet	✓	✓	
Write words from dictation	✓	✓	
Capitalization & punctuation	✓	✓	
Work on phonics	✓	✓	
Practice writing letters	✓	✓	
Work on assigned topic			✓
Follow assigned format			✓
Check for spelling, grammar, etc.			✓
Talk with teacher about writing			✓
Define purpose and audience			✓
Make formal outline			✓

APPENDIX C

REFORM MATH INSTRUCTION

Table 7. Reform Math Instruction

Reform Items	Grade		
	K a=.87	First a=.85	Third a= .75
Identifying relative quantity	✓	✓	
Sorting objects into subgroups by rules	✓	✓	
Ordering objects by size or other properties	✓	✓	
Making, copying, or extending patterns	✓	✓	
Work in mixed-achievement groups	✓	✓	
Peer tutoring	✓	✓	
Use music to understand math	✓	✓	
Creative movement or drama	✓	✓	
Explain how problem is solved	✓	✓	
Work with geometric manipulatives	✓	✓	
Play math games	✓	✓	
Performing simple data collection	✓	✓	
Correspondence between number/quantity	✓	✓	
Estimating quantities	✓	✓	✓
Solve problems with partners/groups	✓	✓	✓
Use measuring instruments (i.e. rulers)	✓	✓	✓
Work on real-life problems	✓	✓	✓
Explain answers to math problems			✓
Write reports or do math projects			✓
Use a computer for math			✓
Work with math manipulatives			✓
Practice with measurement			✓
Communicate math ideas effectively			✓
Discuss math solutions with other kids			✓
Use visual representations for solutions			✓

APPENDIX D

TRADITIONAL MATH INSTRUCTION

Table 8. Traditional Math Instruction

Traditional Items	Grade		
	K a=.81	First a=.84	Third a= .60
Adding single-digit numbers	✓	✓	
Subtracting single-digit numbers	✓	✓	
Reading two-digit numbers	✓	✓	
Recognizing value of coins, currency	✓	✓	
Adding double-digit numbers	✓	✓	
Counting by 2s 5s 10s	✓	✓	
Counting beyond 100	✓	✓	
Reading three-digit numbers	✓	✓	
Subtracting two-digit numbers w/o regrouping	✓	✓	
Writing math equations to solve word problems	✓	✓	
Mixed operations (2-3+5)	✓	✓	
Writing numbers between 1 and 10	✓	✓	
Writing numbers between 1 and 100	✓	✓	
Complete problems on chalkboard	✓	✓	
Carrying numbers in addition	✓	✓	
Place Value	✓	✓	✓
Learning skills & procedures to solve routine problems			✓
Making estimates of quantities			✓
Learning math facts/concepts			✓
Number operations			✓
Algebra & Functions			✓
Solve math problems in textbooks			✓
Take math test			✓
Solve math problems in worksheet			✓

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